

THE
AMERICAN JOURNAL
OF THE
MEDICAL SCIENCES

FOR JULY, 1847.

ART. I.—*Statistics of the mortality following the operation of tying the Carotid Arteries and Arteria Innominata.* By GEORGE W. NORRIS, M. D., Surgeon to the Pennsylvania Hospital.

IN the numbers of this Journal for July 1845, and January 1847, I published tables showing the mortality, accidents, &c., following the operations of ligature of the subclavian and iliac arteries. These tables formed parts of an extensive series of cases of ligature of the larger vessels which I collected, for the most part several years since, and finding that they have attracted some attention, I have been induced to proceed in their publication, and now offer to the profession those of the carotids drawn out upon a similar plan. Close examination of the cases recorded in the present tables shows that the operation of deligating the carotid has been too generally looked upon as one of but comparatively little danger; an analysis of them proves that serious symptoms frequently follow the mere cutting off of the supply of blood to the brain through this vessel, at the same time that it strikingly exhibits the frequency and severity of the other accidents which follow it, and throws some light upon the rate of mortality attendant upon operations on the great vessels of the neck.

No. XXVII.—JULY, 1847.

SERIES I.—

No.	Surgeon.	Sex.	Age	Right or left side.	Disease.	Duration of disease.	Ligature separated.
1	Cooper	Female	44	Right side	Aneurism	5 months	11th day
2	Cooper	Male	50	Left side	Aneurism	7 months	22d and 23d days
3	Cline	Male			Aneurism		
4	Macaulay	Male	36	Left side	Aneurism from wound	5 days	
5	Post	Male	35	Right side	Aneurism	10 months	16th and 15th days
6	Dupont	Male	27	Left side	Aneurism	6 months	
7		Female			Aneurism from wound	6 weeks	14th day
8	Coates	Male	41	Left side	Aneurism	6 months	
9	Porter	Female	40	Right side	Aneurism	15 years	19th day
10	Vincent	Male	52	Right side	Aneurism	3 weeks	22d day
11	Holscher	Male	23	Right side	Aneurism		15th day
12	Perry	Male	39	Right side	Aneurism	2 years	13th day
13	Sykes	Female	18	Right side	Aneurism	3 years	10th day
14	Key	Male	40		Aneurism	5 months	7th day
15	Warren	Male	42	Left side	Aneurism	4 years	
16	Lisfranc	Female		Right side	Supposed aneurism		
17	Scarpa	Female	29	Right side	Aneurism		21st day
18	Vincent	Male	48	Right side	Aneurism	8 months	
19	Maurin	Male	40	Left side	Aneurism	1 month	
20	Sisco	Male	17	Left side	Aneurism from wound	2 or 3 weeks	14th day
21	Lyford	Male	36		Aneurism	3 weeks	27th day
22	Chiari	Male	28	Left side	Aneurism from wound		
23	Green	Male	65	Right side	Aneurism	5 months	24th day
24	Dehane	Female	10	Right side	Aneurism from wound		11th day
25	Marchal	Male	25	Left side	Aneurism from wound	2 months	
26	Randolph	Male	25	Right side	Varicose aneurism		
27	Robertson	Male	52	Right side	Aneurism	2 months	17th day
28	Porter	Male	38	Left side	Aneurism	5 weeks	15th day
29	B. Cooper	Male	34	Right side	Aneurism	12 months	33d day
30	Kerr	Female	67	Right side	Supposed aneurism		26th day
31	Liston	Male	9	Right side	False aneurism	2 months	
32	Johnson	Male	29	Right side	Aneurism	5 weeks	22d day
33	Syme	Female	60		Aneurism of internal carotid	5 months	
34	Fairfax	Female		Left side	Aneurism		
35	Eccles	Male	46	Right side	Supposed aneurism		
36	Duncan	Female	30	Right side	Aneurism		
37	O'Reilly	Male	44	Right side	Supposed aneurism	2 years	
38	White	Male	34	Right side	Aneurism	3 months	10th day

ANEURISMS.

Date of operation.	Result.	Period of death.	Cause of death.	Work.
November 1, 1805	Died	21st day	Inflammation of sac	Med. Chirurg. Transacts., vol. i.
June 22, 1803	Cured			Med. Chirurg. Transacts., vol. i.
December 16, 1803	Died	4th day	Hemorrhage	Lond. Med. Review, vol. ii.
December 16, 1812	Cured			Edin. Med. and Surg. Journ., vol. x.
January 9, 1813	Cured			Amer. Med. and Phil. Register, vol. iv.
1814	Cured			Breschet's Trans. of Hodgson, tom. ii.
	Cured			Hodgson on the Arteries, 1815.
January 3, 1817	Died	70th day	Hemorrhage	Med. Chirurg. Transacts., vol. xi.
August 21, 1829	Cured	33d day	Inflammation of sac	Dublin Hosp. Reports, vol. v.
December 19, 1818	Died			Med. Chirurg. Transacts., vol. x.
Sept. 27, 1819	Cured			Lond. Med. Repository, vol. xvi.
Nov. 14, 1820	Cured			Glasgow Med. Journ., vol. iv.
June 20, 1821	Cured	10th day		Philadelphia Journ., vol. vi.
January 24, 1824	Died			Lancet, vol. i., 1823-4.
October 26, 1827	Cured			Boston Med. & Surg. Journ., vol. i.
1827	Died	8th day	Hemorrhage	Am. Journ. of Med. Sci., vol. ii.
May 23, 1828	Cured			Lancet, vol. i., 1828-9.
July 18, 1829	Died	7th day	Inflammation of brain	Med. Chirurg. Transacts., vol. xxix.
Nov. 20, 1829	Cured			Lond. Med. & Phys. Journ., vol. viii., N. S.
	Cured			Archives Générales, tom. xxi.
October 30, 1816	Cured			Med. Chirurg. Transacts., vol. xi.
July 18, 1829	Died	9th day		Méd. Opérat. of Velpeau, tom. 2, 1839.
April 15, 1831	Recovered			Dublin Journal and South's Trans. of Chelius.
January 20, 1832	Cured			Am. Journ. of Med. Sci., vol. x.
June 19, 1835	Died	6th day		Journal Hebdomadaire, tom. iv.
1836	Died	day after	Congestion of brain	At Pennsylvania Hospital.
March 21, 1837	Cured			Dublin Journal, vol. xii.
September 22, 1838	Died	6 w'ks after	Hemorrhage	Dublin Journal, vol. xvii.
April 7, 1840	Cured			Guy's Hospital Reports, No. 13, 1841.
April 30, 1840	Recovered			Edin. Med. & Surg. Journ., vol. lxi.
October 21, 1841	Died	15th day	Hemorrhage	On a variety of False Aneurism, 1842.
January 22, 1842	Cured			Lond. Med. Gazette, vol. ii., 1841-2.
April, 1842	Died	in 30 hours		London and Edin. Monthly Journ., 1842.
July 18, 1842	Died	5th day	Exhaustion	Philada. Medical Examiner, vol. vi.
Sept. 23, 1843	Recovered			Lancet, 1844.
December 25, 1843	Died	17th day	Spasm of glottis	Edin. Med. & Surg. Journ., vol. lxi.
July 20, 1844	Died	9th day	Apoplexy	Dublin Medical Press, Oct. 1844.
August 28, 1845	Cured			Lancet, February 1846.

SERIES II.—

No.	Surgeon.	Sex.	Age	Right or left side.	Disease.	Duration of disease.	Ligature separated.
1	Fleming	Male			Hemorrhage after wounded throat		
2	Abernethy	Male		Left side	Wounded throat		
3	Twitchell	Male	20	Right side	Hemorrhage after wounded neck	10 days	13th day
4	Dupuytren	Male	42	Right side	Hemorrhage after gunshot wound	22 days	
5	Marjolin	Male	20		Hemorrhage after gunshot wound	6 days	
6	Giroux				Hemorrhage after gunshot wound		
7	Collier	Male	29	Left side	Hemorrhage after wound at angle of jaw	5th day	13th day
8	Travers	Male		Right side	Hemorrhage from fungous tumour of cheek		
9	Brodie	Male	27	Left side	Hemorrhage following extraction of a tooth		
10	Brown	Male	35	Right side	Hemorrhage after wounded throat	7 days	12th day
11	Casack	Male	36		Wounded throat		21st day
12	Boileau	Male	36	Right side	Wounded throat		
13	De Cruz	Male	44	Left side	Wounded throat		
14	Miller	Female			Hemorrhage after wounded throat	27 days	
15	Travers	Male	35	Right side	Wounded throat		13th day
16	Mayo	Male	23	Right side	Hemorrhage from ulcer in throat		15th day
17	Luke	Male	45	Left side	Hemorrhage from ulcer in throat		22d day
18	Langenbeck	Male	29		Hemorrhage after tying thyroids for goitre		
19	Horner	Male	34	Right side	Wounded throat		
20	Syme	Male	9	Left side	Hemorrhage from ear and fauces		24th day
21	Tyerman	Male	35	Right side	Wounded throat		11th day
22	Mayo	Male	30	Right side	Hemorrhage after wounded throat	6 days	
23	Ellis	Male	28		Hemorrhage after wounded throat	8 days	9th day
24	Bedor	Male	20	Left side	Hemorrhage after wounded throat		14th day
25	Duncan	Male	60	Left side	Hemorrhage from ulcer in throat		
26	Sedillot	Male	19	Right side	Hemorrhage following wound of ext. carotid	13 days	
27	Spence	Male	38	Left side	Hemorrhage from ulceration of face		
28	Peace	Male	22	Right side	Hemorrhage from ulceration behind jaw		12th day
29	Vincent	Male	28	Right side	Hemorrhage after wounded tongue	8 days	
30	Clark	Male	29	Left side	Wound of external carotid		16th day

WOUNDS, &c.

Date of operation.	Result.	Period of death.	Cause of death.	Work.
October 17, 1803	Cured			Med. Chir. Review, Jan. 1827.
	Died	30 hours after	Inflammation of brain	Surgical Works, vol. ii.
October 18, 1807	Cured			New Eng. Quarterly Journ. of Med. and Surg., Oct. 1842
February 24, 1814	Died	6th day		Breschet's Trans. of Hodgson, tom. ii.
1814	Died	2d day	Hemorrhage	Breschet's Trans. of Hodgson, tom. ii.
1814	Died	9th day	Effusion of blood at base of brain	Breschet's Trans. of Hodgson, tom. ii.
June 22, 1815	Cured			Med. Chir. Transacts., vol. vii.
April 13, 1816	Died	16th day		Lond. Med. and Phys. Journ., April, 1827
July 5, 1816	Died	2d day		Med. Chir. Transacts., vol. viii.
June 14, 1817	Cured			Dublin Hospital Reports, vol. i.
August 16	Died	60th day	Hemorrhage	Dublin Hosp. Reports, vol. iii.
July 22, 1822	Cured			North American Med. & Surg. Journ., vol. i.
February 27, 1825	Cured			Boston Med. & Surg. Journ., vol. ii.
October 9, 1825	Cured			Western Journal, vol. i.
June 27, 1826	Died	52th day	Hemorrhage	Lond. Med. and Phys. Journ., vol. i. N. S.
October 19, 1828	Cured			North American Med. & Surg. Journ., April, 1830.
October 4, 1829	Cured			London Medical Gazette.
1829	Died	24 hours after	Inflammation of brain	Archives Générales, tom. xix.
June 18, 1832	Cured			Am. Journ. of Med. Sci., vol. x.
September 18, 1832	Cured			Edin. Med. and Surg. Journ., vol. xxxviii.
August 14, 1834	Cured			Med. Chir. Review, vol. xxiv., N. S.
1834	Died	13th day	Inflammation of brain	Medical Quarterly Review, vol. i.
January 26, 1835	Cured			Lancet, vol. ii., 1834-5.
April 24, 1835	Cured			La Presse Médicale, No. x.
March 29, 1836	Died	14th day	Bronchitis	Edin. Med. & Surg. Journ., vol. lxii.
April, 1842	Died	10th day		Gazette Médicale, No. xxxvi., 1842.
May 29, 1842	Died	61st day	Exhaustion	London & Edinburgh Monthly Journal, vol. ii.
November 8, 1844	Died	31st day	Hemorrhage	At Pennsylvania Hospital.
April 16, 1845	Died	6th day	Hemorrhage	Medico-Chirurg. Transacts., vol. xxix.
October 14, 1846	Cured			Lond. Med. Gazette, Feb. 1847.

SERIES III.—IN EXTIRPATION

No.	Surgeon.	Sex.	Age	Right or left side.	Disease.	Duration of disease.	Ligature separated.
1	Cogswell	Female	37	Left side	Parotid tumour	6 months	14th day
2	Goodlad	Female		Left side	Parotid tumour		11th day
3	Mott	Male	49	Right side	Fungous tumour in neck		14th day
4	Mott	Female	17	Right side	Osteo-sarcoma of jaw	2 years	15th day
5	Mott	Female	22	Left side	Osteo-sarcoma of jaw	1 year	14th day
6	Mott	Male	18	Right side	Osteo-sarcoma of jaw	6 years	
7	Awl	Female	12	Right side	Ossific tumour of jaw	13 months	15th day
8	Fouilloy	Female	52	Left side			
9	Siedman	Male	53	Right side	Parotid tumour	12 years	26th day
10	Scott	Male	45	Right side	Tumour of face	4 months	
11	Ewing	Male	52	Right side	Tumour in neck	30 years	
12	Mott	Female	19		Tuberculated sarcoma of neck	5 years	
13	Gibson	Male	17	Left side	Medullary tumour in neck	5 years	36th day
14	Luzenburg	Male	62	Left side	Parotid tumour	20 years	
15	Warren	Male	52	Right side	Scirrhus tumour in neck	30 years	
16	Roux	Female	30	Right side	Parotid tumour	2 years	
17	Brett	Female	17		Parotid tumour	5 years	
18	C. B. Gibson	Female	35	Right side	Osteo-sarcoma of jaw	6 years	22d day

SERIES IV.—CEREBRAL

No.	Surgeon.	Sex.	Age.	Right or left side.	Disease.
1	Liston	Female	24	Left side	"Beating pain in left cheek and jaw, stretching to the throat, and, indeed, involving whole head."
2	Becton	Male	22	Left side	Epilepsy
3	Preston	Male	50	Right side	Hemiplegia of left side
4	Preston	Male	25		Epilepsy
5	Preston	Male	51	Right side	Epilepsy and hemiplegia
6	Preston	Male	24	Right side	Headache and partial paralysis

OF TUMOURS.

Date of operation.	Result.	Period of death.	Cause of death.	Work.
Nov. 4, 1803	Died	20th day	Hæmorrhage	New England Journ. of Med. and Surg., vol. xiii., 1824.
Sept. 5, 1815	Cured			Medico-Chirurg. Transacts., vol. vii.
Nov. 14, 1818	Died	3 months and 19 days after		Med. & Surg. Register, Part 2d.
Nov. 18, 1821	Cured			New York Med. and Phys. Journ., vol. i.
March 30, 1823	Cured			New York Med. and Phys. Journ., vol. ii.
May 15, 1823	Died	4th day	Inflammation of chest	New York Med. and Phys. Journ., vol. ii.
1827	Cured			Western Journal, vol. i.
1829	Cured			Archives Générales, tom. xviii.
Sept. 7, 1830	Cured			Medico-Chirurgical Review, vol. xvi., N. S.
Feb. 4, 1832	Died	42 hours after	Convulsions	London Medical Gazette, vol. ix., 1832.
Feb. 11, 1832	Died	4th day	"Gradually sunk"	Edin. Med. and Surg. Journal, vol. xxxviii.
February 1832	Cured			Am. Journ. of Med. Sci., vol. xii.
Nov. 20, 1832	Cured			Am. Journ. of Med. Sci., vol. xiii.
1834	Cured			Annales de Chirurgie, tom. vi.
March 7, 1837	Recovering on 8th day			On Tumours, p. 183.
June 19, 1837	Died	14th day		Gazette des Hôpitaux, 1837.
	Cured			India Journ. of Med. & Phys. Sci., August, 1839.
June 12, 1844	Cured			Am. Journ. of Med. Sci., vol. viii., N. S.

AFFECTIONS.

Duration of disease.	Ligature separated.	Date of operation.	Result.	Work.
9 years	22d day	June 22, 1817	Recovered	Edin. Med. and Surg. Journ., vol. xvi.
1 month	18th day	March 21, 1827	Recovered	North American Med. & Surg. Journ., vol. iv.
5 years	20th day	November 22, 1830	Recovered	Transactions Med. Phys. Soc. of Calcutta, vols. v. & vi.
Fits 6 years, palsied 20 days		February 4, 1831	Recovered	Transactions Med. Phys. Soc. of Calcutta, vols. v. & vi.
		August 23, 1831	Recovered	Transactions Med. Phys. Soc. of Calcutta, vol. vi.
		September 2, 1831	Recovered	Transactions Med. Phys. Soc. of Calcutta, vol. vi.

SERIES V.—ERECTILE TUMOURS, TUMOURS OF

No.	Surgeon.	Sex.	Age.	Right or left side.	Disease.	Duration of disease.	Ligature separated.
1	Travers	Fem.	34	Left side	Erectile tumour in orbit	4 years & 5 months	21st and 22d days
2	Dalrymple	Fem.	44	Left side	Erectile tumour in orbit	9 months	27th day
3	Wardrop		six wks	Left side	Erectile tumour in cheek	6 weeks	
4	Dupuytren	Male	20	Right side	Erectile tumour of ear and temple		12th day
5	Jameson	Male	26		Fungus of the antrum	13 months	
6	Arendt	Male	35	Right side	Erectile tumour of face		17th day
7	Pattison	Male	18	Left side	Erectile tumour of face	9 years	
8	Davidge	Male		Left side	Fungus of the antrum		
9	Finley	Male		Right side	Fungus of the antrum	some months	
10	Barovero	Male		Right side	Tumour behind the jaw		10th day
11	McClellan	Fem.	5	Left side	Erectile tumour in orbit	4½ years	14th day
12	McClellan	Fem.	9	Left side	Erectile tumour of cheek		14th day
13	McClellan	Male	16	Right side	Vascular fungus from dura mater		about 2 weeks
14	Wardrop	Fem.	five mos.	Left side	Erectile tumour of face		11th day
15	Frick				Cancer of parotid		
16	Mayo	Male	26	Right side	Fleshy tumour of neck		17th day
17	Magendie	Fem.	25	Left side	Tumour of maxillary sinus		11th day
18	Wardrop	Male	22	Left side	Erectile tumour of face and head	12 years	25th day
19	MacLachlan	Male	30	Left side	Pulsating tumour on scalp		
20	Williaume	Male	24	Left side	Fungous tumour on temple		21st day
21	Warren	Fem.	18	Right side	Erectile tumour in orbit		29th day
22	Bushe	Male	19	Left side	Erectile tumour on inside of cheek	from birth	
23	D. L. Rogers		eight mos.	Right side	Erectile tumour of face	from birth	
24	Mayo	Male	five mos.	Left side	Erectile tumour of face		5th day
25	Nighels	Fem.	23	Left side	Erectile tumour of face and occiput	2 years	30th day
26	Velpeau	Male	16	Left side	Erectile tumour of temporal fossa		
27	Chelius	Male	19	Right side	Aneurismal varix of temple	1 year	21st day
28	Busk	Male	20	Right side	Erectile tumour in orbit	6 months	13th day
29	Scott	Male		Right side	Erectile tumour in orbit	1 month	
30	Miller	Fem.	42	Right side	Erectile tumour in orbit	18 months	
31	Peyrogoft		nine mos.	Left side	Erectile tumour on occiput	9 months	removed on 8th day
32	Zeiss		fifteen mos.	Left side	Erectile tumour of face	15 months	8th day
33	Jobert	Male		Right side	Erectile tumour in orbit	3 years	1 month after
34	Auchinloss	Fem.	23	Left side	Erectile tumour on temple	from birth	19th day
35	Velpeau	Male		Right side	Erectile tumour in orbits		
36	Cadwell	Fem.	60	Right side	Erectile tumour in orbit	1 year	39th day
37	Dudley	Male		Right side	Erectile tumour in orbit	several years	
38	Blackman	Male	30	Right side	Fungous tumour of neck	2 years	
39	Liston	Male	20		Arterial varix of scalp		
40	A. C. Post	Male	27	Right side	Erectile tumour of cheek	spot from birth, but increasing for 3 years	20 months
41	Bos	Fem.	17	Right side	Tumour of the diploe	5 months	
42	Petrequin	Male	22	Left side	Erectile tumour in orbit		

DIPLOE, JAW, MAXILLARY SINUS, AND NECK.

Date of operation.	Result.	Period of death.	Cause of death.	Work.
May 23, 1809	Cured			Med. Chirurg. Transacts., vol. ii.
April 7, 1813	Cured Died	14th day	Irritation of ulcer	Med. Chirurg. Transacts., vol. vi. Med. Chirurg. Transacts., vol. ix.
April 8, 1818	Recovered			Leçons Orales, tom. iv.
Nov. 11, 1820	Cured			Philad. Med. Recorder, vol. iv.
Nov. 8, 1821	Cured Cured			Lancet, 1828-9. Burns' Anat. of Head and Neck, 1823.
April, 1823	Died	6 weeks	Lock-jaw	Burns' Anat. of Head and Neck, 1823.
July 27, 1824	Recovered			Maryland Medical Recorder, vol. i.
May 19, 1825	Died	69th day	Inflammation of brain	Journ. de Physiologie, tom. vii.
June 10, 1825	Cured			N. Y. Med. & Phys. Journ., vol. v.
1825	Cured			N. Y. Med. & Phys. Journ., vol. v.
1825	Cured			N. Y. Med. & Phys. Journ., vol. v.
March, 1826	Cured			Lancet, vol. xii.
1826	Died		Long continued constitutional disturbance occasioned by disease.	Lancet, vol. xii.
Jan. 20, 1827	Recovered			Lond. Med. and Phys. Journ., vol. v., N. S.
March 4, 1827	Recovered			Journ. de Physiologie, tom. vii.
1827	Cured			Lancet, vols. xii. and xiii.
July 10, 1828	Died	4th day	Inflammation of chest	Glasgow Med. Journ., vol. i.
June 26, 1829	Recovered			Journ. Univers. Hebdom., tom. iii.
January 2, 1830	Cured			On Tumours.
January 15, 1830	Cured			Med. Chirurg. Bulletin, vol. i.
Dec. 12, 1832	Cured			Am. Journ. of Med. Sci., vol. xiii.
	Recovered			Med. Quarterly Review, vol. i.
March 12, 1835	Cured			Boston Med. and Surg. Journ., vol. xx.
1835	Died	16th day	Repeated hemorrhages	Méd. Opératoire, tom. ii., 1839.
Jan. 18, 1836	Recovered			Gabe on Aneurismal Varix, 1844.
Feb. 2, 1836	Cured			Med. Chirurg. Trans., vol. xxii.
Nov. 10, 1836	Cured			Med. Chirurg. Trans., vol. xxii.
1836	Died			Lond. & Edin. Monthly Journ., vol. ii.
Jan. 26, 1837	Died	8 days after	Apoplexy	Revue Médicale, 1838.
August 30	Died	117 days after	Hemorrhage	Revue Médicale, 1838.
August 30	Died	114 days after	Convulsions	Gazette Médicale, 1840.
August 7, 1839	Cured			London Medical Gazette, vol. i., 1842-3.
July 7, 1839	Cured			Gazette Médicale, 1840.
1839	Recovered			Boston Med. and Surg. Journ., vol. xxiv.
Sept. 16, 1840	Cured			Transactions of College of Physicians of Philadelphia, 1842.
January 1841	Cured			Am. Journ. of Med. Sci., vol. x., N. S.
June 21, 1843	Died	8th day	Long continued constitutional disturbance	Lancet, 1844.
	Died		Hemorrhage	New York Journ. of Medicine, vol. v.
April 12, 1845	Died	10 da's after	Phlebitis of internal jugular	Archives Générales, 1845.
June 5th, 1845	Died Recovered		Diarrhœa & hemorrhages	Gazette Médicale, 1846.

SERIES VI.—BRASDOR'S

No.	Surgeon.	Sex	Age.	Right or left side.	Disease.	Date of operation.	Result.	Period of death.	Cause of death.	Work.
1	Wardrop	Fem.	75	Right	Aneurism of root of carotid	June, 1825	Recovered			On Aneurism
2	Wardrop	Fem.	57	Right	Aneurism of root of carotid	Dec. 10, 1826	No improvement			On Aneurism
3	Lambert	Fem.	49	Right	Aneurism of root of carotid	March 1, 1827	Recovered			On Aneurism
4	Bush	Fem.	36	Right	Aneurism of root of carotid	Sept. 11, 1827	Recovered			On Aneurism
5	Evans	Male	30	Right	Aneurism of arteria innominata and root of carotid	July 22, 1828	Recovered			Villard-bo Thèse
6	Montgomery	Male	40	Left	Supposed aneurism of carotid	March 10, 1829	Recovered			Med. Chirurg. Review, Jan. & April, 1830
7	Mott	Male	51	Right	Aneurism of arteria innominata	Sept. 26, 1829	Recovered			Am. Journ. of Med. Sci., vols. v. & vi.
8	Wickham	Male	55	Right	Aneurism of arteria innominata	Sept. 25, 1829	Recovered			Lancet, 1840
9	Key	Fem.	61	Right	Aneurism of arteria innominata	July 20, 1830	Died	A few hours after operat'n	want of am't of blood necessary to innervation	Lond. Med. Gazette, July, 1830
10	Morrison	Male	42	Right	Aneurism of arteria innominata and root of carotid	Nov. 8, 1832	Recovered			Am. Journ. of Med. Sci., vol. xix.
11	Fearn	Fem.	28	Right	Aneurism of the innominata	Aug. 30, 1836	Recovered			Lancet, 1836-35
12	Colson	Fem.	63	Left	Aneurism of root of carotid	1839	Recovered			Gaz. Médicale. Sept. 1840. & Mém. French Acad., 1841.
13	Ferguson	Male	56	Right	Aneurism of arteria innominata & root of subclavian	June 22, 1841	Died	7th day	Pleuro-pneumonia	Am. Journ. of Med. Sci., vol. iii., N. S.
14	O'Shaughnessy	Male	42	Right	Aneurism of aorta, supposed to be of the root of carotid and innominata		Died	10th day	Rupture of aorta	Gaz. Médicale. No. xviii., 1843
15	Campbell	Male	45	Right	Supposed aneurism of arteria innominata	March 8, 1845	Died	19th day	Pneumonia	Lond. & Edin. Monthly Journ. 1845

OPERATION.

REMARKS.

Progressive diminution of tumour after operation till the 5th day, when it increased, inflamed, suppurated, and ulcerated. Upwards of three years after the operation the patient continued to enjoy good health.

Tumour did not diminish after operation. About three weeks after it the swelling increased, and its pulsations became stronger. Patient died March 23, 1827. On dissection the heart was found hypertrophied. *The carotid artery was found to be completely perious, and could hardly have been tied.*

Tumour diminished in size, and finally entirely disappeared. Five weeks after operation the wound, which had healed, reulcerated. April 18, hemorrhage from wound, which was repeated at intervals till 23d; again on 1st of May, when she died. On dissection pericarditis and dilatation of aorta. Sac filled with coagulum. Carotid thickened, and lower part of it completely closed. Just above where the ligature was applied an ulcerated opening of it existed.

The tumour was very large and suffocation imminent. After the operation it rapidly diminished. On 27th day after it the wound was healed, and the tumour was reduced to one-half its former bulk. Patient was alive and well in March, 1830.

Pulsation stronger on 23d. By 23d October tumour had diminished one-third, was hard, and pulsation scarcely perceptible in it. On 6th August, 1830, tumour suppurated and discharged about oz. xxiv of pus mixed with a number of hairs. The opening was enlarged, and two fleshy tumours, of the size of a small pullet's egg, were brought into view by it, having on their surface several hairs analogous to those which had been discharged. A ligature was put around that which first presented, as low as possible behind the sternum, and it was allowed to slough off. The second was also tied, and then removed by the knife close to the ligature. After this the 13th, she enjoyed perfect health, and all trace of tumour had disappeared.

By 14th March the tumour was reduced to half its size, but on 25th again enlarged, and on 29th May gave way and discharged oz. viii of dark fetid fluid. On following day the opening was enlarged and gave exit to coagula. On 3d July expectorated oz. vi of fluid blood, and died on 12th. Dissection showed no vestige of sac remaining. Left carotid was obliterated from the bifurcation to aorta. A distinct aneurism of aorta, of the size of an orange, existed between the arteria innominata and the left carotid.

The pulsation in and size of tumour gradually diminished after the operation, and by 16th of October both had entirely disappeared. The patient died from suffocation April 23, 1830. Dissection showed the right carotid to be obliterated. No tumour externally, internally was of the size of the two fists.

Immediately after the operation the tumour grew less, and the pulsation in it diminished. In December the tumour was increasing rapidly, and was more than double its original size, and on the 3d of that month the subclavian was tied. This operation was followed by relief of symptoms, but the tumour continued slowly to increase. He died 16th Feb., 1840, from bursting of the studded with osseous plates.

On autopsy found aneurism of the innominata and of the cross of the aorta. The left carotid was almost obliterated, and the vertebrals smaller than in the natural state.

Afternoon of operation pulsation in the tumour "was tremendous." After the 17th it became weaker, and tumour began to harden and diminish in size. He returned to his employment (charcoal maker), and dropped down dead 20 months after the operation. The arteria innominata was to point at which ligature had been applied, was dilated into a sac, which was plugged up by a dense fibrinous deposit.

By 9th Sept. tumour had lessened considerably, and the pulsations were less distinct, and on 19th of same continued gradually diminishing. Two years after operation there was no appearance of tumour externally, but in consequence of a return in her symptoms a ligature was put round the subclavian (Aug. 2, 1839). From this she recovered, and her symptoms were mitigated. She died Nov. 27, 1839, of pleuritis, having lived two years and three months after ligature of the carotid. Dissection showed the innominata none to be the seat of disease. The sac, except a channel of the usual size of the innominata, was filled by a dense, organized conglum. The tilage there was an interruption to its continuity, where the ligature had been applied. The upper portion of the vessel was impermeable to where the external carotid was given off.

Pulsation in tumour gradually diminished after operation. One year after it was the size of a small nut, and pulsation was scarcely perceptible in it. M. Robert, in his Thèse states, that in June, 1842, the patient continued in a satisfactory state.

After the operation the tumour decreased, and its pulsations were weakened. On dissection the tumour was nearly filled with pretty firm clots of fibrin. No clot was found in the carotid even as high up as the ligature, which was placed one-fourth of an inch below the bifurcation.

Tumour did not diminish after the operation. On dissection the carotid was found obliterated, both above and below the ligature, by a firm clot. The ligature had been placed three-fourths of an inch below the bifurcation.

On tightening the ligature the swelling disappeared. After a short time it began gradually to return, though it did not nearly regain its original size. On 11th the tumour was the size of a walnut. Dissection showed the tumour to fill up the whole of the anterior and middle mediastinum in front of the root of the right lung, extending from the cartilage of the third rib to the top of that vessel, and also the transverse portion of the arch of the aorta as far as the left carotid. The first bone of the sternum, end of clavicle, and first rib were denuded of periosteum, and formed ossified deposits. Left ventricle slightly hypertrophied.

SERIES I.—ANEURISMS.

Mortality.—Of the thirty-eight cases in this series, twenty-two recovered, and sixteen died.

Sex.—Of these thirty-eight cases, twenty-seven were males, and eleven females. Of the eleven females, two had aneurisms following wounds, seven laboured under true aneurisms, and two had tumours in the neck which were mistaken for it.

Right or left side.—Of thirty-three cases in which the affected side is noted, twenty-two were on the right, and eleven on the left side.

Age.—This is mentioned in thirty-four of the cases, of which number there were under 20, 4; between 20 and 30, 7; 30 and 40, 8; 40 and 50, 9; 50 and 60, 3; 60 and 70, 3.

Disease.—Of the thirty-eight operations contained in the series—thirty-three were done for the cure of aneurism—one was for the cure of varicose aneurism, and in four the tumours though supposed to be aneurisms were afterwards discovered not to be such.

Period the ligature separated.—In twenty-one of the cases in which this is noted, the ligature came away: in thirteen, before the twentieth day; in seven, between the twentieth and thirtieth days; and in one on the thirty-third day.

Return of pulsation in the tumour, after the application of the ligature.—In nine of the thirty-eight cases, pulsation was noticed in the tumour after the operation. In one of these, (No. 2.,) pulsation “did not wholly cease” after the application of the ligature, but continued for upwards of two months, the cure afterwards being perfect. In No. 10, pulsation became more faint, but did not entirely cease on tightening the ligature. Two days afterwards it was not perceptible, and the swelling diminished to one-fourth of its original size. In No. 13, the tumour was noticed to pulsate on the fourteenth day after the operation, and continued to do so four or five months. In Nos. 23, 28, and 33, pulsation never entirely left the tumours. In the first of these, aneurisms existed on both sides of the neck. Pulsation did not immediately cease on the application of the ligature, though it did in the course of the following hour; on the succeeding day, however, it recurred feebly, and continued diminishing till the seventeenth day, but never ceased. The patient recovered from the effects of the operation. The second died after repeated hemorrhages at the end of six weeks. The last, (No. 33.,) was a woman aged sixty, affected with aneurism of the internal carotid. The tumour which had existed about five months, and had attained the size of a large walnut, was in the throat in the situation of abscess connected with the tonsil. It presented the diffused aspect of a purulent collection, and a strong and uniformly distending pulsation could be perceived over every part of it. After the artery was tied, pulsation continued in the tumour, but was much less forcible. The patient died in thirty hours. The operator adds, “though

doubts might be entertained as to the cure of the disease, through want of sufficient obstruction in the flow of blood, no apprehension was entertained of danger from the operation, and I feel quite unable to offer any satisfactory explanation of its fatal issue." This case is highly interesting, as presenting an example of aneurism in a very unusual situation, and is accompanied by a drawing which shows very distinctly its position in regard to the artery. In No. 9, pulsation was observed in the tumour four hours after the operation and left it on the sixteenth day. In number 15, pulsation in the tumour continued for a number of weeks—a cure taking place, and in No. 32, slight pulsation returned on the night of the operation, but afterwards entirely disappeared.

Hemorrhage after the operation.—All the cases in which this occurred, after the operation, but two proved fatal. In No. 12, the artery was tied on the 14th of November, and the hemorrhage had place on the 29th of December, and was arrested by firm pressure and low diet. In No. 38, it took place on the evening of the tenth day, to the amount of a pint, and was checked by pressure, but on the next day there was a recurrence of it, which ceased spontaneously.

Bursting of the tumour.—In six of the thirty-eight cases, the tumour suppurated and either burst spontaneously or was laid open. Of these, four died, and two were cured. In No. 5, the opening in the sac took place nearly eight months after the operation, and in No. 9, there was an interval of about four months between these occurrences. In one case, which died, No. 36, the opening was in the pharynx fifteen days after the operation, and on the same day the tumour was laid open. In No. 27, the aneurism had ruptured into the mouth, previous to the operation; yet the patient did well.

Cause of Death.—Of the thirty-eight cases operated upon for aneurisms sixteen died. Of these, two died from inflammation of the sac; one from inflammation of the brain; five, from hemorrhage coming on at periods between the fourth and seventieth days; one, from spasm of the glottis; two, from apoplexy and congestion of the brain; one, from "exhaustion" on the fifth day; and in four, the cause of death is not noted.

Mistakes in Diagnosis.—In seven of the thirty-eight cases in the table, mistakes in diagnosis occurred. In No. 16, the tumour, on dissection, proved to be a fungus hæmatodes. In No. 37, the disease was carcinomatous. In No. 30, the aneurism was supposed to be cured, the patient living nine months after the operation, but on post-mortem examination, it was found to be a tumour surrounding, though in no way connected with the artery. In No. 35, the patient was also looked upon as cured of his aneurism, and died four months afterwards of bronchitis, when the disease was found to be a glandular swelling. In No. 25, the aneurism was mistaken for an abscess, and incised; repeated hemorrhages followed, and the external carotid was secured. This procedure failed to arrest the bleeding and the common carotid was tied. The patient died on the sixth day. In

No. 31, a boy nine years of age, the tumour was carefully examined to ascertain if pulsation existed, "a hint having been given that it might in some way be connected with the carotid," but not the slightest pulsation could be perceived in any part, except in the course of the vessel. Such being the case, a puncture was made in the tumour under the impression that it contained matter. A gush of arterial blood followed, and about four ounces were lost in a few seconds. The wound was closed by hare-lip pins, and the twisted suture, and the bleeding checked. On the following day the carotid was tied close to the origin of the innominate. On the 3d of November, a sudden gush of arterial blood took place from the wound in the neck, the ligature being still firm. This was suppressed by plugging the wound with lint. Hemorrhage recurred six times after this, the last leaving him in a state of perfect collapse, and he died on the 5th. On dissection the proximal end of the vessel was found to be quite open, and there had been no attempt at the formation of a clot. The operator, Mr. Liston, believes that the tumour was originally a serofulous abscess accompanied with ulceration of the vessel, and consequent effusion of blood into the cyst; this, he thinks, was proved by the position and form of the cyst, (plates of which are given,) the nature of the lining membrane, the absence of lamellated coagula, and the kind of opening in the artery—it being very small, and the three coats being traceable to the margin of it. No. 22, was an aneurism following a wound of the vertebral artery alone, in which the common carotid was tied at the hospital of Naples. The tumour was seated below the mastoid process. The patient died on the ninth day, and the autopsy showed the aneurism to occupy the vertebral artery between the transverse processes of the two first cervical vertebrae. The vertebral artery being very rarely the seat of aneurism, it may be well to notice here a case somewhat similar to that just mentioned, which is recorded by M. Ramaglia of Naples. The patient, aged thirty-nine, received a wound from a sharp-pointed instrument behind the left ear, which resulted in the formation of an aneurismal tumour in that situation. The common carotid was tied for its cure, but finding that this did not arrest pulsation in the tumour, the ligature was removed. A short time after, the patient died, and dissection showed the aneurism to arise from the vertebral artery. (*Velpeau, Méd. Opérat.*, tom. ii. p. 220.)

Another example of aneurism of the vertebral artery is mentioned by Mr. South, in his translation of Chelius's Surgery, as having recently occurred in the Northern Infirmary at Liverpool; the carotid artery could be distinctly traced over the pulsating swelling, of the actual nature of which there were some doubts as to what kind of aneurism it was, or whether only a pulsating tumour. It was decided to tie the common carotid artery. The tumour rapidly increased after the operation, and in about a fortnight the patient died by the bursting of the aneurism into the trachea. On post-mortem examination, an aneurism of the vertebral artery, between

the transverse processes of the fourth and fifth cervical vertebræ, was found.

The diagnosis of aneurismal tumours of the neck, is acknowledged by all to be at times exceedingly difficult. An instance in which enlargement of the thyroid gland, as proved by dissection, was mistaken for an aneurism, has been reported by the late Dr. S. P. Griffitts. Wishing, he observes, "to think the disease was glandular, endeavours were frequently made to draw the tumour out from the artery, but without success, as it was so firmly fixed over the vessel as not to be moved from it, and the pulsation was such as to convey the idea that there was no intervening substance." The propriety of an operation had been suggested, to which objection was made from a belief that the artery below the clavicle was diseased. In the *Dictionnaire des Sciences Médicales*, tom. xviii., the case of a creole with a tumour in the neck is mentioned, which was submitted to the inspection of several celebrated surgeons in America, Paris, and London; all of whom pronounced it to be an aneurism of the carotid artery. It was afterwards ascertained by M. Boyer, that no such disease existed—but simply, an extensive enlargement of the glands of the neck.

Derangement of the Cerebral Functions.—In twelve of the thirty-eight cases, serious symptoms were manifested in the brain after the ligature. The effect of cutting off the supply of blood through one of the carotids is so interesting, and until the late researches of Mr. Chevers, of London,* was looked upon so lightly by practical surgeons, that we shall give these results somewhat in detail. In the first case in which the operation was ever done for the cure of aneurism, No. 1, paralysis of the left arm and leg, came on on the eighth day. Four days afterwards, the palsy of the arm had almost disappeared, and no further report concerning it is made. In No. 4, there was great drowsiness on the third day, and on the following day, the right side was much more feeble than the left. After some days, these symptoms gradually disappeared. In No. 18, the patient became slightly convulsed on the right side, one and a half hours after the operation, and sunk into a state of stupor. Two days afterwards, his left side became paralyzed. In No. 16, it is stated, that "a few hours after the operation, symptoms of inflammation of the brain arose," but were subdued by the antiphlogistic treatment. In No. 37, apoplexy occurred on the morning of the day following the operation, from which the patient partially recovered, and lingered on for nine days after it. In No. 35, slight cerebral disturbance arose the day after the ligature, and on the fourth day there was paralysis of the left side. In No. 17, dimness of vision, and a sense of coldness over the right side of the face, came on immediately after the operation, which gradually disappeared in a few

* The paper of this gentleman will be found in the *London Medical Gazette*, vol. i., N. S., 1845.

hours, though for some days, headache, difficulty of deglutition, and heaviness in the right side, were complained of. In No. 20, the patient lost the use of the left eye and was affected with hardness of hearing. In No. 25, there were slight convulsions on the second day after the operation. In No. 9, giddiness with numbness, and trembling of the right arm came on two hours after the operation, the numbness disappeared the day after. In No. 34, hemiplegia followed, (the side is not stated,) which, it is added, may have occurred at the moment of tying the ligature, but was not remarked until an hour or more after the operation, and the patient continued faint and hemiplegic till her death on the fifth day. In No. 26, coma supervened on the night after the operation, and the patient soon after died. Of these twelve cases, seven died.

These cerebral symptoms were noticed at various intervals after the tying of the artery, and in all of them, are attributable either to cutting off the direct supply of blood to the brain, or to disease consequent upon the altered condition of the circulation in that organ. It is impossible to determine what particular state of the vessels of the brain predisposes it to become diseased after obliteration of the carotid. The researches of Mr. Chevers, leads him to think that in most instances the fatal mischief is consequent upon deficient arterial supply, but that in some cases it may arise from increased pressure of blood upon the arteries of the affected hemisphere, in consequence of the supply to the carotid being diverted through the vessels of the circle of Willis.

SERIES II.—WOUNDS, &c.

Of the thirty cases contained in this series, fifteen were cured, and fifteen died.

Period the ligature separated.—In thirteen cases in which this is noted the ligature came away; in one, before the tenth day; in nine, between the tenth and twentieth days; and in three, between the twentieth and thirtieth days.

Hemorrhage after the operation.—In six cases hemorrhage followed at various intervals after the application of the ligature, and of these three died.

Derangement of the cerebral functions.—In eight of the thirty cases in this series, serious symptoms on the side of the brain, either from inflammation or from interruption to its normal circulation occurred, and of these eight, only two recovered. In one of them, No. 16, the operation was followed by troubled vision, which remained imperfect on the right side. In No. 18, immediately after the application of the ligature, the patient became motionless, lay with closed eyes without answering when spoken to, unless the questions were repeated several times. This state was followed by coma and death in twenty-four hours. In No. 6, headache and delirium occurred on the fifth day after the operation, and on the

seventh stupor and death. In No. 14, it is stated that she lay for two or three days subsequent to the operation in a state of insensibility, and then gradually recovered. In No. 26, hemiplegia of the left side of the body and right side of the face was observed three hours after the operation, and the patient died on the ninth day. In No. 2, the man, on the night of the operation, became delirious and had convulsions which were most violent on the left side, and soon afterwards his right side became hemiplegic. In No. 22 hemiplegia of the left side came on on the sixth day. In No. 29, the patient during the operation made violent efforts with his right side, but never moved the left extremities. During the night, the right extremities were frequently convulsed. In the two following days twitchings of the right side and paralysis of the left continued.

In No. 12, it is noted that the patient was epileptic, and that this condition was not removed by cutting off the supply of blood to the brain. In No. 19, the patient during the operation "became relaxed and seemingly fainty, and his voice, which had been previously coarse, fell to a whisper and could not be raised above it." The respiration was not disturbed. The operator attributes the feebleness of the voice to "turning off the supply of blood to the larynx through the upper thyroid artery," though it would seem more probable that in the necessary hurry of this operation, and the obscurity of parts from the flow of blood, that the superior laryngeal nerve had been included in the ligature. In No. 9, the vessel was secured to arrest hemorrhage following the extraction of a tooth, styptics and the actual cautery having been first in vain tried, but the bleeding continued after the vessel was tied.

In No. 26, a mistake occurred in regard to tying the artery which merits notice. On the fifth day after the receipt of the wound in the side of the neck, the surgeon in attendance tied what was supposed to be the primitive carotid; compression, which had before been employed, was continued. Three days after hemorrhage returned as severely as ever, and M. Sedillot, who was then consulted, finding that the ligature had really not been placed around the artery, proceeded to secure it.

A most instructive case, in which an error similar to that just mentioned was made, occurred at the New York Hospital in 1840. The case was one of violent hemorrhage arising from ulcerations towards the middle of the neck, in which it was determined to apply a ligature to the common carotid. An incision was made in the ordinary manner on the inner side of the sterno-mastoid muscle, and in the usual situation of the sheath of the vessels a large mass of fibrine was found adhering to all the tissues in that region and confounding them in such a manner, that it was difficult to distinguish one from another. After careful dissection, what appeared to be the sheath of the vessel was exposed and divided. A cylindrical body of the size and colour of the artery was then brought into view, and a ligature passed under it. Several of the surgeons present, as well as the operator, felt the

vessel under which the ligature was placed and were convinced that it was the carotid artery, although no distinct pulsation could be felt in it; this was attributed to the extreme prostration to which the patient was reduced. The ligature was then tied without any effect in arresting the flow of blood. From this it seemed evident that the subclavian, or one of its branches were wounded, but the patient was so prostrate that it was not deemed safe to attempt any further operation. Firm pressure with the hand was therefore continued. Death occurred early on the following day. Upon post-mortem examination, the ligature was found to embrace only a band of organized lymph, situated immediately anterior to the sheath of the vessels, which were in a perfectly healthy condition. The hemorrhage was found to proceed from the inferior thyroid, which was destroyed by ulceration in one half of its circumference for the space of an inch. (*New York Medical Gazette*, Feb. 9th, 1842.)

SERIES III.—ON EXTIRPATION OF TUMOURS.

In this series, there are eighteen cases in which the common carotid was tied previous to, or at the time of the extirpation of tumours of the neck or jaw. Of these, six died, and one is stated to have been "recovering on the eighth day."

In one of these, the external jugular vein was wounded in exposing the artery, (No. 16.) In No. 15, where the artery of the right side was secured, the patient had, on the evening of the operation, "not exactly paralysis, but great difficulty in moving the left arm and leg." On the seventh day, "incipient coma, loss of sensation and motion in the left arm" is noted, and on the day after sensation and motion in the arm is said to have returned. No further account is furnished. In No. 10, the patient is stated to have been seized with convulsive action of the muscles of the whole body, but chiefly on the left side, on the morning after the operation, and on the succeeding day was suddenly taken with convulsions, soon became comatose and died.

The ligaturing of the carotid, previous to the extirpation of tumours about the neck or face, originated with Mr. Goodlad. Unless there is reason to suppose that the tumour involves the artery itself, it would seem to be an unnecessary step, inasmuch as pressure alone, if confided to a careful assistant, will as effectually guard against the danger from hemorrhage. In determining whether or not it is to be employed, it must be borne in mind that this preliminary measure is in itself a *dangerous* operation, and as has been justly remarked by Mr. Chevers, that "it would be far better for the surgeon to make up his mind to contend with an active hemorrhage, than that he should submit his patient to the chance of fatal hemiplegia, even although he believed that chance to be a remote one." The idea seems still to be entertained by some, that after such a step, the subsequent dissection of the tumour is nearly bloodless. The opinion is

an erroneous one, the anastomoses being so free in the enlarged state of vessels which usually exist in these cases, as at times to pour out blood profusely. In 1827, Mr. Lizars attempted to remove the superior maxilla for a medullary tumour of the antrum. He commenced by tying the common carotid artery of the affected side, but was prevented from completing the operation by hemorrhage, the patient having lost upwards of two pounds of blood in a few seconds. In a case which occurred to Dr. Mott where the carotid was tied immediately before a disarticulation of one-half of the jaw, the hemorrhage was exceedingly profuse, and some fifteen or twenty vessels required to be tied. Where the ligature is applied to the artery, any number of hours, or days, as has been done, before the removal of the tumour, the procedure cannot, we think, be justified. According to Mott and Stedman, another advantage besides that of arresting hemorrhage is to be derived from it, viz., that of being an important means of preventing inflammation in the wound. Facts might be adduced to show this view to be erroneous—the inflammation being no greater where the artery is not secured, than where it is tied.

The difficulties and immediate dangers of exposing the carotid vessel too, in cases of large tumours, are not to be set down lightly. Roux, as dexterous an operator as any of his age, was fifteen minutes in securing the artery. Goodlad found it a very difficult matter to accomplish, in consequence of the nearness of the tumour. In a case operated upon by Dr. Mott, notwithstanding the patient was recumbent, and very little blood was lost, she became pale and almost pulseless during and immediately after the tying of the carotid, and her mind became perturbed to so great a degree that cordials were administered and she was put to bed faint and exhausted, and the removal of the tumour deferred till the following day. In an operation, mentioned by Dr. Warren, of a similar kind, a vein was wounded in the search for the carotid, which permitted the entrance of air into the circulation, and gave rise to alarming symptoms, making it necessary to suspend the operation, which was performed a week afterwards *without* tying the vessel. As a preliminary step to the operations we are now considering, the general experience of surgeons of the present day is decidedly against the proceeding. Mr. Liston, whose success in the management of tumours of the mouth and jaws, face and neck, is well known to every surgeon, speaks on this point very emphatically. "I have never," says he, "found occasion to tie the carotid previous to, or during the operations for their removal, and I have never regretted omitting this supposed precautionary measure." The latest writer I have seen upon the subject, Mr. Solly, gives it as his opinion, that if a ligature on the carotid is of advantage in any cases it is only where the tumour is of large size, and of a fungoid character, "in fact, that it is only necessary in those cases in which it is not right to operate at all."

SERIES IV.—CEREBRAL AFFECTIONS.

The idea of curing epilepsy by tying the carotid artery seems to have been founded upon the false principle, that this operation would diminish the amount of blood sent to the head, a view, however, which is manifestly incorrect, for though the supply sent to the brain by one of these vessels should be cut off, it passes in increased amount by the artery of the opposite side and the vertebrals. But the notion that epilepsy is essentially dependent on vascular excitement, it need hardly now be said, is in itself an erroneous one. Any irritation, in any part of the body, and either corporeal or mental, may give rise to it. Vascular excitement may doubtless occasionally be its exciting cause, though even where this is the case any benefit resulting from obstructing the flow of blood through the carotid is not likely, for the reason before mentioned, to prove permanent. As early as 1822, ligature of the carotid was done in an epileptic patient with wounded throat, by Dr. Boileau, and for a considerable time he remained without an attack, though ultimately a recurrence of them had taken place. In Dr. Becton's case, No. 2 of the table, the patient experienced two fits during the first ten days that elapsed after the operation, but after this he returned to his former intemperate habits and had frequent attacks. No. 4, who was operated upon in February 1831, is stated by Mr. Preston to have continued well and free from epileptic attacks up to January 1833. In No. 5, where hemiplegia of the right side of twenty days' standing existed with the epilepsy, the right carotid was tied August 23d, 1831, and he was discharged from the hospital September 26th, having had several epileptic attacks, though of a milder kind than before the operation. In November he was re-admitted, having suffered much from epilepsy and headache after his discharge. On the fourteenth of that month, the *left* common carotid was tied, and he was discharged December 8th, his epileptic attacks continuing. On the 14th of February, 1832, he was again re-admitted in a state of insensibility, and had been speechless for fourteen days. Under the use of purgatives, a seton, leeches, &c., these symptoms gradually disappeared, and in January 1833 was still living, though three months before that date he had suffered from an attack of paralysis agitans. In an appendix to his second paper, Mr. Preston states, that in one case of epilepsy this operation "proved entirely ineffectual." The patient had suffered from the disease for eight years. *Both* common carotids were tied with an interval of a month, and the day following each operation he had an epileptic fit not differing from those he had previously.

In one of the other three cases of this series (No. 1), the artery was tied for the cure of a neuralgic affection, the operator being led to perform it from noticing that pressure, which was accidentally made on the artery, gave some relief; the benefit derived from it was only momentary. In Nos. 3 and 6 it was done with a view of curing paraly-

sis. In the first of these, there was loss of power and sensation in the left arm and left lower extremity, and at the period of his discharge from the hospital, (twenty-first day after the operation,) the patient was able to walk about, the arm remaining paralytic. In January 1833, he continued alive, and had regained in great part the use of his arm. In the second, No. 6, partial loss of motion existed in the left arm and leg, the patient being unable to walk without support. There was also complete loss of vision in the right eye, and that of the left was impaired. The operation was done on the right side on the 2d of September, and on the 27th, it is stated that he walked five miles, the morning after which, the sight of the left eye was less perfect and his head hot. He was slightly salivated, blistered between the shoulders and took iodine, but without benefit. The diminution of the vision being now attributed to a return of the affection of the brain, for which the first operation had been done, the *left* common carotid was tied on the 10th of October. On the 11th of November he was discharged from the hospital, the vision remaining imperfect, though in other respects he was well.

The results of these cases we have thought it right, as matter of history, to give somewhat in detail. It need hardly be observed that quite as much if not more benefit as was produced in these cases, is daily seen to follow any well directed treatment in cases of epilepsy and paralysis, and this without a resort to means which endanger life, indeed by hygienic treatment alone.

SERIES V.—ERECTILE TUMOURS.—TUMOURS OF DIPLOE, JAW, MAXILLARY SINUS AND NECK.

In this table there are forty-two cases in which the carotid has been tied with the view of arresting the flow of blood to the tumour, and thus curing or arresting the growth of erectile tumours situated upon the head or face, or of firm tumours of the jaw, maxillary sinus, or neck. Of these forty-two cases, thirty-one were for the cure of erectile tumours, or arterial varices seated upon the head or face, of which number eighteen were cured, eight died, and five recovered from the effects of the operation without being cured. One of these latter, No. 27, was operated upon by the ancient method five years after ligature of the carotid and cured; another, No. 24, is stated at the date of the report, two months after the operation, to have the tumour flattened and reduced to one-third of its former volume; in a third, No. 4, all pulsation in the arteries ceased, though the erectile tissue continued unchanged, and pressure was resorted to in its after treatment; in the fourth, No. 42, galvano-puncture was tried after the ligature of the vessel, but without benefit; and the fifth is the case of Velpeau, which is detailed in another place.

Of the eleven cases in which it was done to cure or arrest the growth of other tumours, five died, four recovered from it but were not cured, and

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two are stated to have been cured, though in one of them, No. 5, part of the tumour was removed by the knife after the operation, and caustics ultimately were made use of to destroy it.

The treatment of purely erectile tumours by cutting off the supply of blood to them, by the application of a ligature to the main artery, originated with Pelletan, and has often, as will be seen by the above results, proved successful in the carotid—more frequently, we may add, than in other situations. In some instances, though it has failed to make a perfect cure, yet it seems to have so diminished or retarded the progress of the disease, as to have allowed a resort to excision, the ligature, or pressure, which without it, would have been either more dangerous or altogether inapplicable.

The facts recorded show that ligature of the carotid to diminish *non-erectile* growths of the face, jaws, or neck has proved altogether ineffectual where it has been alone depended upon, and cannot at this day be countenanced by sound surgery.

A summary of the whole number of cases contained in this series furnishes the following results.

Mortality.—Of the forty-two cases, twenty were cured, thirteen died, and nine recovered from the operation though not cured by it.

Right or left side.—In thirty-nine of the cases in which the side is noted, nineteen were on the right side and twenty on the left.

Age.—This is given in thirty-four of the cases, of which number there were under 20, 16; between 20 and 30, 11; 30 and 40, 4; 40 and 50, 2; æt. 66, 1.

Period the ligature separated.—In twenty-three of these cases in which it is noted the ligature separated; in three, before the tenth day; in eleven, between the tenth and twentieth days; in six, between the twentieth and thirtieth days; and in three, above the thirtieth day.

Return of pulsation in the tumour after the application of the ligature.—In ten of the cases of erectile tumours, more or less thrill of pulsation was noticed in the tumours after the application of the ligature. In six of these cases, the disease was situated in the orbit, and in the other four, on the face or head. The case of M. Velpeau (No. 35) is so rare and interesting a one, that I annex some of the details of it. The patient was affected with tumours in both orbits, offering all the signs characteristic of erectile tissue, and that on the right side was large and projecting. Compression of the right primitive carotid arrested completely the pulsation and thrill in the tumour of the left orbit, and incompletely in that of the right, while pressure on the left carotid put a stop completely to all pulsation in the tumour of the right orbit, and but incompletely in that of the left. After the right artery was ligatured the tumour of the left side ceased to pulsate; the tumour of the right side shrunk, but pulsation could still be perceived in it. At the end of ten days, all pulsation had ceased, and the patient appeared to be cured. He remained, however, in the

hospital for six weeks, and during this interval it became evident that the cure was not perfect, pulsation having reappeared by degrees in the tumour of the right side. In February 1840 (about six months after the operation) he remained in nearly the same state as he was six weeks after it, and at that date, compression of the carotid of the left side, arrested both the pulsation and thrill in the tumour of the right orbit. Ligature of the last named artery was at this period proposed, but was refused by the patient.

Hemorrhage after the operation.—This occurred in six cases, four of which terminated fatally. In No. 6, bleeding from the wound in the neck took place on the twenty-third day, was repeated several times and ceased spontaneously; in No. 2, hemorrhage from the lower part of the wound occurred and also ceased spontaneously.

Cause of death.—Of the forty-two cases in this series, thirteen died. Of these, one died from ulceration of the tumour; four from hemorrhage; one, from convulsions; one, from inflammation of the brain; one, from phlebitis of the internal jugular; one, from lock-jaw; one, from inflammation of the chest; two, from long continued constitutional disturbance occasioned by disease; and one from apoplexy.

Derangement of the cerebral functions.—In eight of the forty-two cases, very serious symptoms of affection of the brain were manifested after the ligature of the vessel. In No. 4, a sense of numbness in the left thoracic member came on the evening of the operation which disappeared on the second day. In No. 10, some fever with delirium and paralysis of the left side of the face and hand appeared on the third day.* In No. 17, convulsions and paralysis of the right arm came on the sixth day, after recovery from which, at the end of three months, her intellect remained enfeebled; the disease for which the operation was done being but little changed. In No. 18, vision of the left eye became seriously affected on the eleventh day after the operation, and the patient had some degree of deafness and delirium; on the eighteenth day the eyeball was protruded and sloughed. In No. 26, complete hemiplegia followed the operation.† In No. 30, the woman had paralysis of the left side on the second day after the operation. In No. 32, aged fifteen months, the child was attacked suddenly with convulsions and hemiplegia of the right side about a week before the complete healing of the wound and forty-nine days subsequent to the operation. In No. 38, paralysis of the left side came on the day after the vessel was tied.‡

* In this case it is noted that the internal jugular vein was included in the ligature.

† The internal carotid was tied in this case as well as the common trunk.

‡ Another case is quoted without details in the *Gazette Medicale* for 1839, from *Rust's Magazin*, where the common carotid was tied by Dohlhoff to arrest the growth of a tumour of the palate; paralysis of the side opposite to that in which the operation was practised took place a week after it, and was followed by death on the twenty-sixth day.

SERIES VI.—BRASDOR'S OPERATION.

Upon fifteen cases of aneurisms of the lower part of the neck, in which the carotid has been ligatured between the aneurismal tumours and the capillaries, four appear to have been cured, (Nos. 1, 4, 5, and 12;) six recovered from the operation and appear to have had some relief of symptoms after it; four died; and in one, in which the artery probably was not really tied, there was no improvement. Nine of these fifteen operations, were done for aneurisms, or cases supposed to be such, of the *arteria innominata*; of which, five recovered and four died.

Derangement of the cerebral functions.—In two of these fifteen cases derangement of the cerebral functions followed the ligature of the carotid. In No. 5, where the right artery was tied, the face and whole right side of the body was partially paralyzed, which paralysis was only discovered when the patient first left his bed, three weeks after the operation. In No. 15, where the right carotid also was tied, the patient complained immediately on tightening the ligature of severe pain in the side of the head; the pupil of the opposite eye became slightly dilated, he felt bewildered and confused, and could with difficulty be induced to remain quiet. On the day of his death, the left pupil was largely dilated. He was sensible to the last.*

Difficulties of diagnosis.—It is not intended in this place to dwell upon the difficulty of diagnosis which must often exist in aneurisms about the root of the neck. We shall here only notice that in three of the cases in our table where the root of the carotid or the innominata was supposed to be the seat of the tumour, it was found actually to have arisen from the aorta itself. Velpeau, in his *Médecine Opératoire*, mentions two other cases in which the carotid was tied where similar mistakes in diagnosis occurred. One of these was observed in the civil hospital of Amsterdam, in a man affected with an aneurismal tumour projecting above the sternum. M. Tillanus believing the left carotid to be the seat of the disease, tied that vessel a little beyond the tumour. The patient recovered from the operation, but died suddenly five months afterwards, when the tumour was seen to arise from the cross of the aorta and to be completely filled with a white clot. The parts are shown in the pathological collection of the hospital. In the other case, the aneurism, which appeared to be on the point of bursting, showed itself as the preceding one just above the sternum. Looking upon it as an aneurism of the carotid, M. Rigen placed a ligature above the tumour on the 21st of February, 1829. After the operation the tumour diminished considerably in size, and the sufferings of the patient became

* The *Gazette Médicale* for 1839, mentions that in an operation by the method of Brasdor, done for the cure of an aneurism of the innominata by Dahlhoff, death followed in a few days, and was preceded by symptoms of paralysis of the side opposite to that on which the artery was tied.

less. On the 13th of June following, he died with symptoms of asthma. The autopsy showed the aneurism to have its origin in the arch of the aorta between the left carotid and the innominate, and was filled up as in the case of Tillanus by coagula.

LIGATURE TO BOTH CAROTIDS.—In a few instances, the carotids of both sides have been ligatured either simultaneously, or with varying intervals of time between the operations. Two such cases have already been noticed where the procedure was followed by Mr. Preston, and we shall here mention the other recorded cases in which it has been done. About the year 1823, Dr. Macgill, of Maryland, tied both carotids in the case of a female affected with fungous tumours of both orbits. Vision was destroyed, and the eyes presented the appearance of a confused mass protruding beyond the sockets. Several months after the operation, she is said to have been doing well, and the tumours subsiding. In a case of aneurism by anastomosis of the scalp, Dr. Mussey tied the left primitive carotid, September 20th, 1827, and on the twelfth day after, secured that of the right side. These operations failed to cure the disease, though they had the effect of reducing the tumour apparently to about one-third of its original volume. It was subsequently, in consequence of its again enlarging and exhibiting a pulsatory movement, removed by excision about three weeks after the second operation. In this operation, which occupied more than an hour, notwithstanding that not more than an inch and a half of the scalp was divided at a time, and that immediately upon the division, firm compression was made upon each lip of the incision, while the vessels were secured by ligature, yet blood to the amount of nearly two quarts was lost, and the application of more than forty ligatures was required. The patient did well, and ten years after it continued to enjoy good health, though occasionally, he had symptoms of cerebral plethora. Langenbeck, in a case of profuse hemorrhage, coming on eight days after the application of a ligature to the superior thyroid for the cure of bronchocele, ligatured both carotids. The patient died on the following day. In a child four and a half years of age, Muller tied one primitive carotid, September 13th, 1831, for the cure of an erectile tumour, and on the 28th of January, 1832, secured the other. The operation was successful. Kuhl of Leipsic, in the case of a man aged 53, affected with an aneurismal tumour on the occiput, tied the left carotid on the 24th of May, 1834, and on the seventy-second day after, in consequence of profuse hemorrhage from the scalp, took up that of the right side. The patient was cured, though he had after hemorrhages from the tumour which suppurred. During the first of these operations, the patient was seized with convulsions, and faintings, and was removed to his bed in a state of insensibility; slight convulsions also occurred during the performance of the second operation. Dr. Mott ligatured both carotids with an interval of

fifteen minutes, for disease of the parotid. Coma supervened, and the patient survived only a few hours. Dr. Ellis, of Michigan, in 1844, tied both of these vessels, with an interval of four and a half days, in a case of secondary hemorrhage, following a gun-shot wound, and cured his patient. Dr. J. M. Warren, in a case of erectile tumour affecting the mouth, face, and neck, tied the left primitive carotid, October 5th, 1845, and on the 7th of November following, ligatured that of the right side. After this second operation, the tumour of the lip diminished one-half, and the fulness of the face and neck, and size of the tongue became less. Finding that the disease did not wholly disappear, it was determined on the 26th of November, to remove the diseased portion of the lower lip "not less than two inches in length, at its free edge," by a triangular incision; but previously to this, in order to avoid hemorrhage, a cataract needle was plunged into the vascular tissue on the left side, and carried in different directions so as to break up and destroy its organization. Three days afterwards, a similar operation was repeated on the right side, and at the time the excision was made, strong compression was exercised on each side of the lip by means of two steel forceps prepared for the purpose, so as completely to intercept the course of blood into it. On the 12th of December the patient returned home well.

ARTERIA INNOMINATA.—The practicability of securing this vessel was suggested by Mr. Burns, in his anatomy of the head and neck, though, as he acknowledges, "without any sanguine expectations of success." It was first put in practice by Dr. Mott, in 1818, in a patient affected with subclavian aneurism, aged 57. The ligature, which was applied about half an inch below the bifurcation of the innominata, separated on the fourteenth day. On the twenty-third day, he had hemorrhage to such an extent, as to threaten instant death; this was arrested for the time by dry lint, and a compress, but after several recurrences of it he died on the twenty-sixth day. (*Med. and Surg. Register*, vol. i.) In 1822, Graefe tied the artery in a similar case. The ligature was applied about an inch above the arch of the aorta, and came away on the fourteenth day. After repeated bleedings, the patient died on the sixty-seventh day. Dr. Hall, of Baltimore, performed the operation, for a third time in 1830. In attempting to isolate the artery, which was in a diseased condition, its coats gave way, and a profuse hemorrhage occurred. An attempt was then made to pass the ligature by means of a needle, but the bleeding continuing, the wound was plugged up, and the patient put to bed. The patient survived until the fifth day. (*Baltimore Med. and Surg. Journ.*, vol. i.) Dupuytren states that a fourth operation was done at Paris, and that the patient also died of hemorrhage. (*Leçons Orales*, tom. iv., p. 611.) A fifth operation was accomplished by Mr. Norman, of Bath, in 1824, and was followed by

death. (*Fergusson's Surgery*, p. 429, Philadelphia, 1845.) In 1837, Mr. Bland operated on a sixth case, in a patient aged 31. On the seventeenth and eighteenth days, hemorrhage occurred, and on the evening of the latter day he died. The ligature was found to have encircled the artery close to its division into subclavian and carotid. (*Lancet*, 1837.) A seventh operation of this kind, was by Mr. Lizars, in 1837. The ligature came away on the seventeenth day. Several hemorrhages occurred after the nineteenth day, and death followed on the twenty-first day. Twenty ounces of coagulated blood were found on the right side of the chest. (*Lancet*, 1837.) An eighth instance of the same operation is given by M. Hutin. In this case, it was done to restrain hemorrhage from the axilla, nine days after deligation of the subclavian outside of the scaleni, which was ineffectual—twelve hours after its performance the patient died. (*Gazette Médicale*, 1842.) A ninth instance is mentioned by Chelius, which was operated upon by Arendt, where death, as in all the previous cases, closed the scene on the eighth day. (*System of Surgery*, Trans. by South.)

The uniform want of success that has followed the application of a ligature to the arteria innominata, shows that the impetus of the blood has a great share in disturbing the process set up by nature after the ligature; to avoid this Mr. Quain has proposed a modification of the operation, viz., the securing of the carotid and subclavian arteries, immediately as they arise from the innominata, it being supposed that by this means the greater length of the artery from the arch of the aorta to the point of ligature, would allow of a firmer coagulum to form. This modification was put in practice by Mr. Liston in 1838, in a case of subclavian aneurism, situated immediately beyond the scalenus muscle. On the eleventh day after the operation hemorrhage took place, and the patient expired on the thirteenth day. On dissection, it was found that a clot had formed in the innominata, but none in the subclavian. (*Lancet*, 1838.) Another case in which both vessels were included in one ligature, just at their origin, occurred to M. Kuhl of Leipsic, in 1836. The patient, aged 43, was affected with a cancerous tumour in the neck, and the surgeon, at the time of the operation, believed that he had tied the carotid alone. Death followed on the third day. Upon dissection, the right carotid and subclavian arteries were found tied together at three lines above their origin from the innominata, and their canals were in part obstructed. (Velpéau, *Méd. Opératoire*, tom. ii.)

It may, perhaps, be well here to remark, that three cases are recorded in which operations for securing the innominata, have been actually begun and finally abandoned. Mr. Porter, in a case of aneurism, cut down upon this vessel, with a view of securing it, but finding it to be in such a condition as not to be advisable for a ligature, he prudently closed the wound. (*Fergusson's Surgery*, p. 430.)

Dr. A. C. Post has given a somewhat similar case which occurred at the New York Hospital. The patient, aged 63, was affected with subclavian aneurism, and an explorative operation was performed "to determine the condition of the subclavian and innominate, with the intention, if the arteries should be healthy, to apply a ligature to the subclavian and carotid near their origin." The innominate, carotid and subclavian were exposed, but the former was so much enlarged that it was deemed inexpedient to apply a ligature to it or to its branches, so that the wound was closed, and the patient sent back to his bed. This was done October 26th, 1839, and he died exhausted by his sufferings, January 19th, 1840. (*New York Journal of Medicine*, No. 4.) The third case of this kind is that of Mr. Key, who commenced an operation upon a young woman affected with aneurism of the right subclavian, with the view either of passing a ligature around the innominate, or of tying both the subclavian and carotid near their common origin, as the state of the parts when disclosed by the knife might render most advisable. After exposing the arteria innominate, it was found impossible to surround that vessel in consequence of a tumour connected with it, and the operation, which had lasted one hour, was abandoned. The patient died on the twenty-third day after it.

Should the unfortunate results of all these cases prevent a resort to the operation of deligation of the brachio-cephalic trunk in future? We think but one answer can be returned to this query; and are happy to find that the author of the most celebrated of our modern treatises on Operative Surgery, Velpeau, has already formally proscribed it.

ART. II.—*On the Endemic Gastro-follicular Enteritis, or "Summer Complaint" of children, as it prevails in the United States.* By EDWARD HALLOWELL, M. D., Fellow of the College of Physicians of Philadelphia, Member of the Academy of Natural Sciences, &c.

CHOLERA INFANTUM, or "the summer complaint" of children, has been considered peculiar to the United States. Billard, in his work on the diseases of infants, alludes to its occasional existence in Paris. In the United States it prevails to a great extent, and the mortality from it is extreme. It occurs in all our large cities, carrying off several thousand children annually; it commences in the Southern States in May, and in the Middle and Western about the beginning or middle of June, and continues until near October, the greater number of cases being observed in July